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# A New Species of *Atriplex* (Chenopodiaceae) from Saline Soils of Central Mexico

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**ABSTRACT.** *Atriplex valdesii*, a new species, is described, illustrated, and compared to its closest presumed relatives. The chromosome number is  $n = 9$ ; photographs of the meiotic cells are presented. The species inhabits saline soils in San Luis Potosí and Zacatecas, Mexico.

Few new species of *Atriplex* (Chenopodiaceae) have been described from North America since Hall & Clements's (1923) treatment, in which many names were reduced to synonymy. Most of the recently described species of the genus are annual herbs, like those described by Weber (1950) and Stutz & Chu (1993). As a result of taxonomic study of the herbaceous species of the genus from North America (Flores Olvera, 1992, and in prep.), a new species is proposed. Due to the great reduction and similarity of the floral morphology in *Atriplex*, the taxonomic floral characters are limited to sex distribution, inflorescence, and several characters of the mature bracteoles, which enclose the fruit. Vegetative characters such as habit, duration, and especially leaves are of taxonomic utility. Form, size, margin, and veining of bracteoles and leaves are useful in the delimitation of species.

***Atriplex valdesii*** Flores Olvera, sp. nov. TYPE: Mexico. San Luis Potosí: 1 km N de Salinas, 2,095 m.s.n.m., 23 jun. 1993, Flores Olvera et al. 1185 (holotype, MEXU; isotypes, CAS, ENCB, GH, MO, RSA). Figure 1.

Herba monoica, annua, prostrata; caules usque ad 50 cm longi. Folia elliptica vel linearia, 4–14 mm longa, 1–3 mm lata, plerumque margine integro. Glomeruli staminati in spicis vel paniculis ad 9.5 cm longis. Bracteoli fructus maturi elliptici, circulares vel rhomboidei, 1.1–2.2 mm longi latique; margines 1–6 dentibus in tertia parte distali.

Monoecious, prostrate annual herb. Stems to 50 cm, terete, reddish, covered with dense white scurf. Leaves with Kranz structure, all alternate, with a

dense permanent scurf, elliptic to linear, 4–14 mm long, 1–3 mm wide, apex acute, base attenuate, margins entire, sometimes irregularly slightly dentate; only the main vein apparent; petioles 0.5–1 mm long. Staminate glomerules in long terminal interrupted spikes or panicles to 9.5 cm long. Mature fruiting bracteoles fused overall, elliptic to circular or rhombic, 1.1–2.2 mm long and wide, margins with 1–6 teeth mostly from the basal third upwards, the central tooth frequently larger, the sides mucronate, with the main vein evident, sometimes smooth, short stalked. Seeds 1–2 mm diam., dark brown; radicle superior. Chromosome number  $n = 9$  (Fig. 2).

*Distribution.* Known from central Mexico near Salinas, San Luis Potosí, and near La Honda, Zacatecas.

*Habitat.* Saline plains dominated by *Distichlis spicata* (L.) Greene, *Sesuvium portulacastrum* L., and *Heliotropium curassavicum* L. and in disturbed soils.

*Atriplex valdesii* is related to *A. linifolia* Humboldt & Bonpland ex Willdenow, *A. muricata* Humboldt & Bonpland ex Willdenow, and *A. texana* S. Watson. Table 1 shows the affinities and differences between them. *Atriplex valdesii* closely resembles *A. linifolia*: the arrangement of the staminate glomerules is similar, but in *A. valdesii* the inflorescences are smaller; mature bracteoles and leaves overlap in form, but differ in length, width, and number of teeth of bracteoles; the leaf margin is always entire in *A. linifolia*, whereas in *A. valdesii* it is usually entire, but it can vary from entire to irregularly dentate (Fig. 1C-2 and C-5 show the common margin). The species differ in duration and habit. Both *A. linifolia* and *A. valdesii* grow on saline plains in Mexico; *A. muricata* and *A. texana* are mostly weeds, occurring from central Mexico into southern Texas, U.S.A. Like *A. valdesii*, *A. muricata* can be annual and has more or less the same leaf length, although *A. muricata* can be wider. The extreme variation in leaf margin, bracteole length and width, and number of teeth of bracteoles can overlap, but

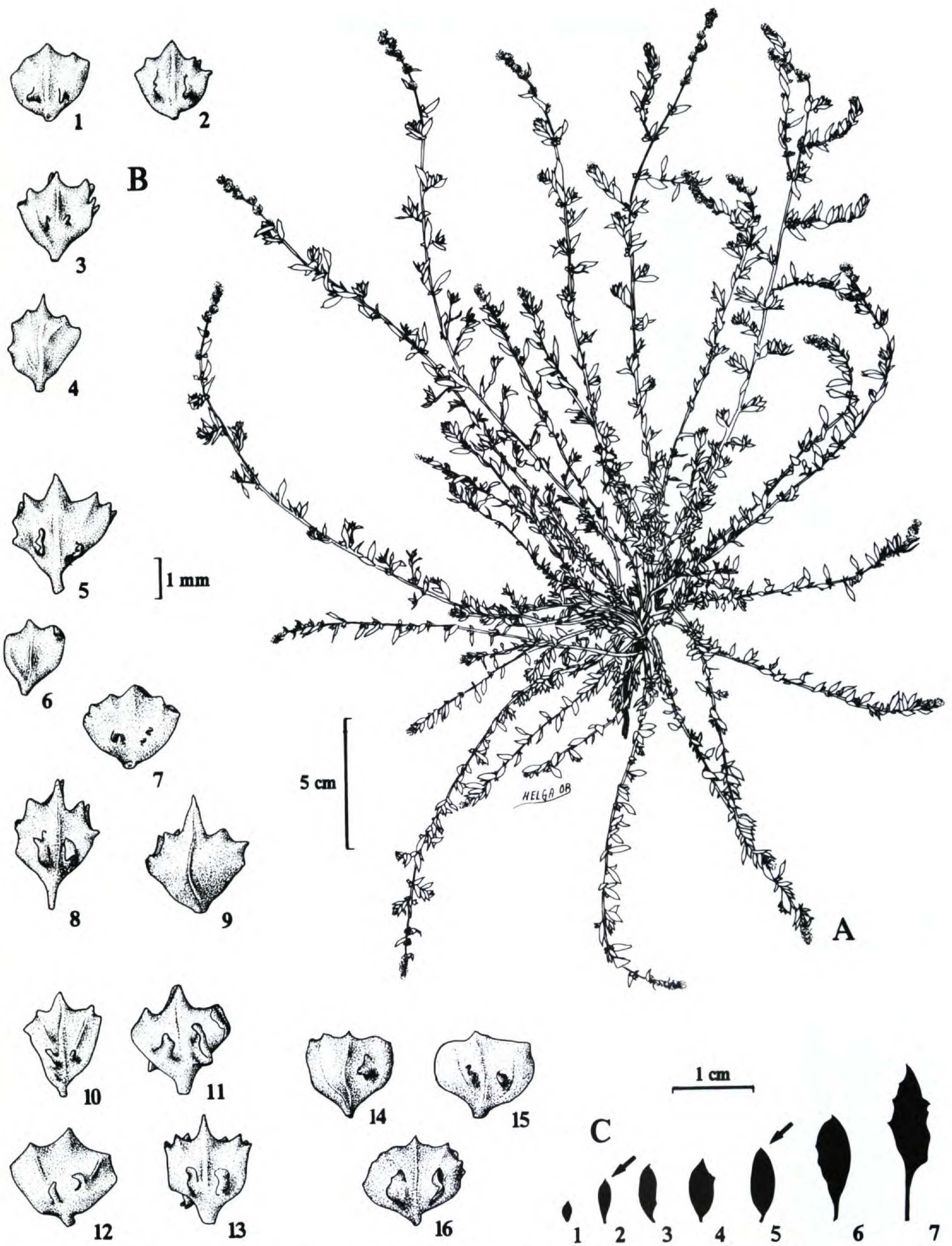


Figure 1. *Atriplex valdesii* Flores Olvera. —A. Entire plant (from Flores Olvera 1185). —B. Mature bracteoles variation (B1-4, from Henrickson & Lee 17534; B5-9, from Flores Olvera 1185; B10-13, from Johnston 7466; B14-16, from Rzedowski 32403). —C. Extreme leaf variation (from Flores Olvera 1185); the most common ones are indicated by arrows.

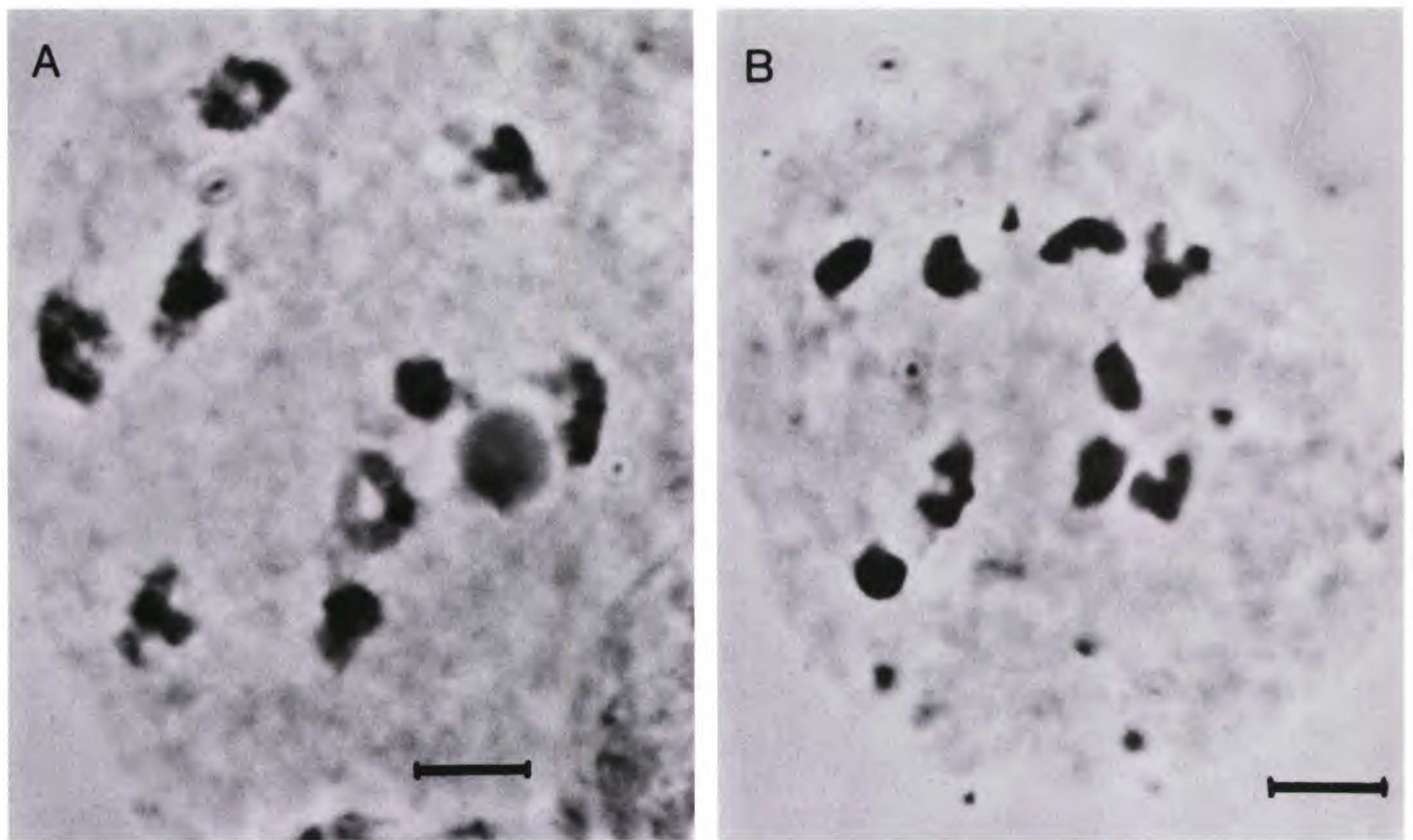


Figure 2. Meiotic chromosomes of *Atriplex valdesii* showing 9II. —A. Prophase I. —B. Metaphase I. Length of scale bar = 5  $\mu$ m.

the most common states are different. The main differences between them are the bisexual glomerules in *A. muricata* (vs. unisexual in *A. valdesii*) and the undeveloped staminate inflorescence. There are some affinities between *A. texana* and *A. valdesii* in duration and leaf characters, but they differ

in habit, male inflorescence length, size of bracteoles, and number of teeth. The affinity with these species places *A. valdesii* in the *A. pentandra* group (sensu Hall & Clements, 1923).

The family Chenopodiaceae has a chromosome base number of  $x = 9$ , but polyploidy is common

TABLE 1. Affinities and differences between the species most closely related to *Atriplex valdesii*, based on morphology.

	<i>A. linifolia</i>	<i>A. muricata</i>	<i>A. texana</i>	<i>A. valdesii</i>
Duration	perennial	annual-perennial	annual	annual
Habit	decumbent	decumbent	erect	procumbent
Leaf length (mm)	6-55	4-20(-33)	2-16(-24)	4-14
Leaf width (mm)	1-5	2-8(-12)	1-4(-7)	1-3(-4)
Leaf margin	entire	mostly dentate	mostly entire	mostly entire
Leaf form	linear to oblanceolate	oblanceolate to obovate	narrowly elliptic to oblanceolate	linear to elliptic
Glomerules	unisexual	mostly bisexual	both	mostly unisexual
Arrangement of staminate glomerules	spikes to panicles	—	spikes	spikes to panicles
Male inflorescence length (cm)	to 21	—	to 2.5	to 9.5
Bracteole form	oblate, elliptic or transversely elliptic	oblate	oblate to transversely elliptic	elliptic to circular or rhombic
Bracteole length (mm)	2-4	2-3(-4)	2.5-5	1.1-2.2
Bracteole width (mm)	2-4	1.5-2.5(-4)	2.5-5	1.1-2.2
Number of teeth of bracteoles	5-9	5-8	6-8	1-6

(McArthur & Sanderson, 1983). According to the information in Goldblatt (1981), most of the annual North American species of *Atriplex* have  $n = 9$ . In order to determine the chromosome number of *Atriplex valdesii*, field samples of young floral buds obtained from *Flores Olvera 1185* were fixed in Farmer's solution (absolute ethyl alcohol:glacial acetic acid, 3:1 vol/vol). Cells were stained with aceto orcein. The chromosome meiotic number is  $n = 9$  (Fig. 2), like the one reported by Nobs (in Goldblatt, 1981) for some species belonging to the *A. pentandra* group.

I take pleasure in naming the species after my professor, Javier Valdés Gutiérrez, teacher of botany of many generations of biologists at UNAM, for his unconditional academic support.

*Paratypes.* MEXICO. **San Luis Potosí:** around NW margin of lake at Salinas near Papalote #1 and adjacent evaporative ponds, 23 Sep. 1978, *Henrickson & Lee 17534* (TEX); Salinas, a la orilla de la población, 21 Oct. 1974, *Rzedowski 32403* (ENCB, MEXU). **Zacatecas:** between La Honda and Sta. Rita, 6–8 Sep. 1938, *Johnston 7466* (GH, US).

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